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The role of social commerce for enhancing consumers' involvement in the cross-border product: Evidence from SEM and ANN based on MOA framework

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ABSTRACT

Although cross-border e-commerce (CBEC) has experienced rapid development, severe issues remain, including information asymmetry and uncertainty. Social commerce platforms have emerged to provide consumers with new approaches to solving these issues and enabling shopping decisions. However, there is still a dearth of knowledge about the underlying mechanism that explains why and how CBEC consumers employ social commerce platforms to facilitate information processing. To address this critical issue, we employed SEM and ANN analytical approaches to examine the research model developed from the motivation-opportunity-ability (MOA) framework. The results revealed associations between the identified motivational factors (information seeking, serendipity, relaxation, and symbolic motivation), opportunity factors (time availability, platform empowerment, and electronic Word-of-Mouth), the ability factor (self-efficacy), involvement, and purchase intentions. In addition, an importance ranking of the most critical drivers of consumers' shopping decisions was derived from various antecedents.

1. Introduction

Due to the rapid proliferation and perfection of ubiquitous internet connections, advanced technology, cross-border logistics, supply chain, and the globalization of international trade, the cross-border e-commerce (CBEC) industry has undergone significant development (Xu et al., 2021a). It is predicted that the global CBEC retailing market value will increase by 30% from 2019 to 2026 (Guo et al., 2021). In China, international circulation has been boosted to promote the rapid development of CBEC to underpin the development of foreign trade. In 2021, imports and exports in China's CBEC market amounted to 1.98 trillion yuan, which constitutes an increase of 15% year-on-year (CNNIC, 2022). However, several problems and uncertainties remain in the rapid growth of CBEC (Mou et al., 2020a).

It has been widely acknowledged that the decision-making process in CBEC has higher requirements for information acquisition and processing compared to domestic retailing (Han and Kim, 2019). This is because the issues in CBEC related to information transparency, uncertainty, and asymmetry are in many ways different from or more pronounced than in domestic e-commerce (Mou et al., 2020b). Moreover, CBEC trading parties and cross-border products are often located in different regions or countries; payments, deliveries, and post-sale services are also conducted across different areas (Xu et al., 2021). Consequently, these difficulties and obstacles can hinder CBEC consumers' information processing and decision-making (Han and Kim, 2019).

The increase in social commerce has afforded consumers new methods of resolving the information asymmetry issue (Xu et al., 2022). As stated by Han and Kim (2019), social media is a critical tool for enhancing CBEC consumers' informedness and enables them to evaluate cross-border products and international brands to develop purchase intentions in an international environment. In China, social commerce platforms (such as Xiaohongshu, Netease Kaola, and Pinduoduo) have emerged and are experiencing rapid development (Zhao et al., 2020). For example, posts on social commerce platforms often include comprehensive reviews of products, various forms of information displays, hyperlinks, and multiple access, facilitating social interactions and information exchange about cross-border products (Liu et al., 2021). These benefits motivate CBEC consumers to indulge in social commerce, which enhances their understanding of the desired products. Moreover,

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the enhanced interactions in social commerce offer unique opportunities for consumers to consider the "wisdom of the crowd", discuss, adjust, and enhance their understanding of an overseas product (Yang, 2021). Especially, many foreign products are not well-known in the daily life of domestic consumers, and such interactions are often missing on other CBEC channels. As a result, social commerce has become a critical channel for facilitating CBEC shopping. Accordingly, it is important to understand how CBEC consumers employ social commerce to facilitate their information processing and decision-making.

Most extant research highlights the issues of risk, uncertainty, and trust when conducting CBEC transactions (Huang and Chang, 2019; Mou et al., 2020a, 2020b; Zhu et al., 2019). Moreover, most studies on CBEC have either focused on delivery and regulation issues (e.g., Kim et al., 2017) from a macro perspective, or have investigated products descriptions, customer experiences, structural embeddedness, and customer value in CBEC (Mou et al., 2020c; Chen and Yang, 2021). Although these studies have deepened our understanding of consumer purchase decisions with regard to cross-border products, *three* research gaps remain in the literature. *First*, few studies have highlighted the role of social commerce in facilitating CBEC consumers' purchase decisions about cross-border products. Although social commerce has been extensively discussed in domestic online retailing, there remains a dearth of knowledge regarding social commerce in the CBEC context (Xu et al., 2021; Guo et al., 2021). As indicated by Han and Kim (2019), without in-depth investigations into such issues, international marketers cannot fully understand whether their social commerce strategies are effectively promoting CBEC consumers to make purchase decisions.

Second, there is scant research investigating why and how consumers employ social commerce to facilitate their information processing and shopping decisions with respect to cross-border products. Importantly, investigations should carefully address several key issues due to the complexity of decision-making processes in CBEC contexts (Cui et al., 2019). *The first issue* is that the factors identified should capture the determining factors comprehensively under the umbrella of a solid theoretical framework. Unfortunately, prior studies have mainly focused on only one aspect of CBEC shopping, such as motivation (Han and Kim, 2019), technological factors (Xu et al., 2021), and product descriptions (Zhu et al., 2020). *The second issue* is that the identified factors should represent unique features of a specific context, as investigations of a specific context can offer unique and detailed knowledge, which is especially important for comprehending an unexplored phenomenon (Xu et al., 2021b).

Third, most existing studies have employed a single analytical method, such as structural equation modeling (SEM) and regression analysis. However, these singular linear analyses may oversimplify the complexity of consumers' decision-making processes (Lo et al., 2022). In particular, various complex factors that influence CBEC consumers' decisions are embedded in the shopping environment. Thus, due to the complexity of CBEC consumers' decision-making processes, a hybrid analytical approach should be employed that examines both linear and nonlinear relationships and ranks significant antecedents to reveal the most critical drivers of consumers' shopping decisions due to various factors.

To address the identified research gaps, this study proposes the main research question. (1) What are the factors determining the purchase intention in social commerce facilitated CBEC? (2) How do these factors affect consumers' purchase intention? (3) What is the importance ranking of determinants in predicting consumers' decision-making mechanisms in our research context? This study aims to employ motivation-opportunity-ability (MOA) to interpret CBEC consumers' decision-making processes facilitated by social commerce. This framework proposes that an individual will engage in a certain behavior if they are motivated to do it, and has the opportunity and ability to perform this behavior. In particular, Andrews et al. (1990) incorporated involvement into the framework, and it is suggested that personal needs, motivation, opportunity, and ability are characterized as antecedents of involvement, while subsequent behaviors are proposed as consequences of involvement (Leung and Bai, 2013). Therefore, the application of MOA can reveal consumers' information processes about cross-border products, their involvement in products and platforms, and their decision-making processes when engaging in social commerce. Moreover, MOA offers a parsimonious framework to generalize the critical elements that determine decision-making behaviors under its theoretical assumptions (Yee et al., 2021). Thus, it offers researchers an opportunity to identify the factors (motivation, opportunity, and ability) that represent the features of the focal phenomenon and to map them theoretically based on the specific research context (Yang et al., 2020; Cui et al., 2020; Guenzi and Nijssen, 2020). In other words, this approach enables us to interpret the critical role of social commerce in facilitating consumers' information processing and decision-making mechanisms pertaining to cross-border products. Ultimately, in this study, we endeavor to employ both SEM and ANN analyses to validate the hypothesized proposed influence mechanism of CBEC consumers' behaviors and reveal the importance of influential determinants with complementary and reinforced results. Accordingly, we apply a hybrid analytical research design to offer significant methodological implications in this emerging research context, which can provide robust and profound insights into the underlying mechanism of CBEC consumers' decision-making processes.

2. Theoretical background

2.1. Social commerce and CBEC

Social commerce employs user-generated content as a key method for assisting online shoppers in discovering, discussing, and evaluating product information in their daily usage (Sheikh et al., 2019; Zhao et al., 2020; Liu et al., 2021). Importantly, user-generated content in social commerce builds countless stimulated situations that offer rich information, which helps consumers to develop product involvement, such as building strong connections between CBEC products and their own life, interests, and needs (Chen et al., 2017; Sohaib, 2021). These connections between personal lives and products from abroad are often missing when browsing traditional CBEC platforms. Social commerce can facilitate consumers' shopping decisions about cross-border products from at least three perspectives.

First, social posts often present how to use cross-border products in a variety of real-life scenarios (Xu et al., 2022). Thus, social posts can inform consumers about cross-border products (Huang and Benyoucef, 2015), empower them to develop connections between these products and their own lives, and engender high involvement with the products. In addition, consumers believe that product information provided by a friend or third party is more credible than information from a company (Sheikh et al., 2019). Thus, social commerce posts are more likely to make consumers believe a product is useful to them and is worth buying (Chen et al., 2017).

Second, posts on social commerce platforms present cross-border product information in a format that is socially consistent with their domestic culture, society, use scenarios, and habits (Qin and De-Juan-Vigaray, 2021). These posts are especially important for helping consumers understand some niche goods from abroad since the product information that a consumer first obtains is presented in a manner that is consistent with the cultures and habits in the exporting countries (Han and Kim, 2019). Therefore, through reading social commerce posts that are presented in a more socially acceptable format, consumers can easily estimate the importance and relevance of a cross-border product in their life and their cultures, allowing them to develop high product involvement and make shopping decisions. Third, enhanced social interactions in social commerce offer ample opportunities for CBEC consumers to communicate directly with each other and the bloggers. This unique feature of social commerce further empowers CBEC consumers to obtain firsthand information and develop an

in-depth understanding of cross-border products that are not well-known in their offline social networks.

Researchers have widely argued about the importance of exploring the effects of social commerce design on consumers' information processing and decision-making in specific contexts (Huang and Benyoucef, 2017; Sohaib and Kang, 2012). Such investigations can reveal the complex cognitive processes that are particularly empowered by the unique features of social commerce applications (Sadovykh et al., 2015). For example, Riaz et al. (2021) believe that consumers can access various information shared by other peers in social commerce (e.g., Facebook, Twitter, and Instagram). Moreover, social interactions and supports enable consumers to easily finalize their purchase decisions. Huang et al. (2021) suggest that social forces in social commerce (e.g., social commerce in hotel settings), such as online social support and personal information-processing drivers, can promote consumers' behavioral intentions. Chen et al. (2017) adopt the social learning perspective, such as learning from forums, communities, and social recommendations in social commerce, to predict purchase intentions in Taobao. Similarly, Gao et al. (2021) shed light on how social commerce (e.g., live streaming) consumers process various information displayed in the context by applying the elaboration likelihood model. To conclude, researchers have highlighted the role of social commerce in facilitating consumers' information processes and decision-making.

Few studies have attempted to address how social commerce can facilitate CBEC consumers' decision-making processes. Xu et al. (2021) suggest that live streaming is a type of social commerce that can provide affordances to resolve information transparency issues in CBEC. Similarly, Guo et al. (2021) point that live-streaming features can increase perceived value and reduce perceived risks, facilitating CBEC consumers' purchasing decisions through the S–O-R paradigm. In addition, Han and Kim (2019) reveal that information technology use (such as social media) can increase consumers' informedness in cross-border electronic commerce. Although these early attempts offer a preliminary understanding of the phenomenon, the existing studies have deficiencies in two aspects. *First*, prior studies have only focused on a single aspect rather than offering a comprehensive understanding of the determining factors. For example, Han and Kim (2019) only address motivational factors. Xu et al. (2021) investigate affordance as a general contract, while Guo et al. (2021) focus on the technological features of live streaming. However, as stated previously, CBEC consumers' decision-making is a complex cognitive process that contains determining elements from multiple aspects. Thus, we argue that studies focusing on this specific phenomenon should carefully address a more comprehensive list of factors within a solid theoretical framework. *Second*, existing studies have mainly adopted a single analytical approach, such as SEM. However, such an approach could be restricted in terms of revealing comprehensive results. Consumers' decision-making processes are complicated, which would probably be oversimplified by following a linear assumption (Chong, 2013). Hence, a further complementary analytical approach is required to address the limitation of using a single research design, which will reveal CBEC consumers' decision-making processes with a higher predictive power in the context of social commerce. Hence, our investigation of how social commerce can facilitate consumers' purchase decisions will contribute to the literature on both CBEC and social commerce, giving the rich and rigorous results produced by dual analytical methods.

2.2. Motivation, opportunity, and ability theory (MOA)

The MOA theory was proposed first in the marketing field. MacInnis and Jaworski (1989) employed MOA to interpret individual consumers' information processing towards the marketing and advertisement information. Motivation refers to the generated driving force to achieve the individuals' desires or targets, such as individuals' physical and psychological preparedness to engage in the desired behavior and a need or a goal that they endeavor to satisfy (Macinnis et al., 1991). Individuals with high motivation often suggest that they are more likely to act upon the goal and actively engage in information processing (Yang et al., 2020). Opportunity factors capture the situational factors that either facilitate or inhibit a behavior (MacInnis and Jaworski, 1989), such as the availability or constraints of time and the negative or positive interference of others in a specific situation (Macinnis et al., 1991; Guenzi and Nijssen, 2020). When an individual has a greater opportunity to conduct a behavior, he or she will be able to process the information more comprehensively and make decisions more easily (Leung and Bai, 2013). Ability refers to the extent to which an individual has the necessary resources, such as knowledge, skills, and money, to conduct a behavior or achieve a goal (Macinnis et al., 1991). It is not out of expectation that people cannot complete a particular task in the absence of basic ability (Yang et al., 2020). It has been widely acknowledged that the enhancement of these attributes integrated into the theoretical framework of MOA can improve the effectiveness of an individual's information processing and fulfillment of the tasks, such as marketing communication, knowledge sharing, and activity participation (Kettinger et al., 2015; Tweneboah-Koduah et al., 2020).

The explanatory power of MOA has been successfully verified in a variety of contexts, such as knowledge sharing (Siemsen et al., 2008; Yee et al., 2021), energy-saving behaviors (Li et al., 2019), and work performance (Guenzi and Nijssen, 2020) in the context of human resources management and community participation in tourism development (Hung et al., 2011; Rasoolimanesh et al., 2017). Especially, existing studies have praised the MOA model as a synthesized model in explaining consumer behaviors in the context of e-commerce and social media usage (Guenzi and Nijssen, 2020; Leung and Bai, 2013). For example, MOA can offer useful explanations for consumers' information processing behaviors or electronic Word-of-Mouth (eWOM) in social commerce and social media (Gruen et al., 2006; Shih et al., 2013). Similarly, motivation, opportunity, and ability factors can influence travelers' social media involvement and thus facilitate their revisit intention to the hotel's website (Leung and Bai, 2013). Hence, MOA offers a solid theoretical framework to explore the underlying mechanism and the associations among the online consumers' specific motivation, opportunity, and ability factors, outcomes, and behaviors in the online retailing context.

In our research context, to facilitate CBEC consumers' understanding of the product and enhance their product involvement, the social commerce platform not only directly offers rich information on cross-border products, hedonic benefits of reading interesting posts, and social value generating through social interaction, but also provide facilitating mechanism from platform and eWOM from other users. Hence, extending MOA to explore how consumers use social commerce to process information and make purchasing decisions towards cross-border products offers us an opportunity to not only identify and examine the critical factors from three categories comprehensively but also explore the underlying information processing and decision-making mechanism under a solid theoretical tenet. The application of MOA in social commerce facilitated CBEC and may offer new knowledge in e-commerce literature.

2.2.1. Motivational factors

In order to identify the factors capturing the motivational factors, this study employed a two-step process based on a solid literature review and a comprehensive understanding of the phenomenon. The first step is to classify the motivational factors based on a comprehensive MOA literature review. The second step is to identify the representative construct for each classification to reflect the unique features of our research context. This step is important since a study focusing on specific constructs and contexts can contribute precise and detailed knowledge to the literature (Guo et al., 2016; Hsu and Tsou, 2011).

As one of the most significant antecedents of consumers behavior, motivational factors have been mainly investigated from three dimensions in prior studies using MOA, including utilitarian, social and

hedonic motivations (Leung and Bai, 2013; Cui et al., 2020; Yang et al., 2020). Appendix A shows examples of the motivational factors' classifications in the existing literature. For example, Guenzi and Nijssen (2020) believe that utilitarian motivation is the best motivation to use a tool and identified usefulness as one of the strongest predictors of salespeople's usage of social media to facilitate their work. While Rasoolimanesh et al. (2017) believe utilitarian motivation (perceived benefits) and hedonic motivation (internal interest) drive community participation in a world heritage site. Yee et al. (2021) investigate the effect of utilitarian motivation (professional reputation) and hedonic motivation (enjoyment) on knowledge sharing on social media. In addition, Cui et al. (2020) shed light on utilitarian (e.g., economic motivation) and hedonic motivation in participating in an online auction. MOA researchers also highlight social motivation, such as the effect of social motivation on participation in eWOM (Gruen et al., 2006), and the impact of connection and sense of belonging on revisiting the intention of Facebook and Twitter (Leung and Bai, 2013). Embracing these three categories, this study presents the most representative constructs for the utilitarian, social and hedonic motivations to unveil the unique features of our research context.

Utilitarian motivation often captures functional, instrumental, and pragmatic motivation, such as the degree to which a product/service provides the expected utility (Wongkitrungrueng and Assarut, 2020). Driven by utilitarian motivation, individuals tend to consciously pursue the desired goals to achieve satisfactory results (Bridges and Florsheim, 2008), such as sufficient information, economic benefits, or convenience. Prior studies indicate that individuals often employ two approaches while obtaining information: search and discovery (Chung et al., 2017). During the search process, referred to as information seeking, consumers input specific keywords in the search engine of social commerce platform to search for the most relevant post for information. While the "discover" process, referred to as serendipity, can also happen when an individual finds interesting and valuable information by chance. Both the approaches of searching on purpose or discovered by chance can satisfy CBEC consumers' information needs, hence we use information seeking and serendipity as two types of utilitarian motivations in this study.

Prior studies indicate that information-seeking is the most critical utilitarian motivation during social media usage (Gan, 2017). Similarly, social commerce has the significant advantage of offering useful and rich information on cross-border products. We define information seeking as the extent to which CBEC consumers seek and obtain the necessary information from social commerce platforms to satisfy their perceived needs of understanding the cross-border product of interest (Wilson, 1999). For example, motivated by the desire for information seeking, CBEC consumers can gain a comprehensive understanding of cross-border products, such as the brand, functions, appearance, and user experience. Besides, CBEC consumers can also seek information regarding the shopping processes, such as payment method, currency, exchange rate, overseas warehouse, delivery timeline, tariff, after-sale service, return policy, etc. The information regarding cross-border products and shopping processes might be difficult to obtain via other channels. Thus, the primary motivation for consumers to use social commerce platforms for CBEC shopping is to seek information and deal with the issues of information asymmetry.

Prior literature identifies two fundamental properties of serendipity: unexpectedness and value. First, serendipity involves an element of unexpectedness, such as finding unexpected information (Grange et al., 2019). Hence, researchers believe that serendipity is a part of the web browsing experience (Chung et al., 2017). While browsing posts and short videos on social commerce platforms, consumers may discover good cross-border products by coincidence and related to their interests, such as cross-border products of niche brands they did not know about before. Second, serendipity requires that something of value is found. The information they discovered by coincidence can offer a variety of utilitarian values. For example, consumers may discover a new blogger whose posts offer highly valid, reliable, and interpretable information to facilitate their understanding of a cross-border product. In addition, consumers may also discover the complaining post that illustrates the risks, inconvenience, and disappointing customer service towards a cross-border product that they planned to buy. Due to advanced technologies, such as recommendation algorithms, AI, and big data, consumers have a more significant chance to discover "serendipitous information" by coincidence without searching. Hence, serendipity is employed since it is an indispensable factor for understanding consumers' utilitarian motivation for using social commerce platforms to facilitate their CBEC consumptions.

Hedonic motivation refers to the feelings of pleasure and arousal from the activities (Cui et al., 2020), which is related to the fulfillment of hedonic expectations. While using social media, users often obtain enjoyment and spend their spare time, which can greatly satisfy their hedonic motivations (Gan, 2017). In this study, we adopt relaxation to represent hedonic motivation and define it as the CBEC consumers' motivation of obtaining the feeling of relaxation and pleasure through using social commerce platforms. Social commerce posts often introduce cross-border products in a humorous and lively way to create a relaxed and pleasant atmosphere for their viewers. Consumers often believe that the process of understanding cross-border goods through social platforms is also a process of passing time happily. The shopping process is inherently entertainment (Yahia et al., 2018). In addition, the information on cross-border products is presented to consumers only after careful induction, collation, and edition, such as the collection of cross-border products evaluation and the CBEC shopping strategies and tips. These carefully sorted posts not only bring convenience to consumers but also a sense of pleasure since the shopping process becomes user-friendly and relaxing. Thus, relaxation is an important hedonic motivation for CBEC consumers to use social commerce to facilitate their CBEC shopping decision.

Prior literature has widely acknowledged that social motivation is a significant driving force of shopping activities, and consumers with high social motivation are more inclined to indulge in the shopping process (Gan and Wang, 2017). Consumers attach high importance to the symbolic meaning of shopping behaviors since they believe they can obtain a variety of social benefits, such as social integration and social recognition, and externalize their self-cognition via the shopping experience (Koo et al., 2008). Thus, we adopt symbolic motivation to represent the social motivation in this research context, since the social commerce platform offers symbolic cues of economic status and class and suggests that CBEC shopping behavior is socially preferable (Wongkitrungrueng and Assarut, 2020). Given that social commerce posts often imply that cross-border products are niche goods and scarce commodities, many people believe these goods have high quality and price. Thus, consumers may believe that their shopping behaviors facilitate their feeling of superior and symbolize their social and economic status (Bozkurt and Gligor, 2019). Meanwhile, the approach of using social commerce to guide CBEC is still emerging, consumers who indulge in this approach may believe themselves as innovator and pioneer (Hughes, 2010). In addition, consumers may also obtain a self-identify during the interaction with the blogger and other co-viewers. When others warmly recommend the cross-border product selected or adored by the consumers, the feeling of social recognition and social integration is developed. Consumers may also observe how the bloggers and others understand and select cross-border products. The process helps consumers infer various symbolic cues, such as the characteristics of others, the popularity of products, and whether a product will be accepted by their social networks (Wongkitrungrueng and Assarut, 2020). Hence, symbolic motivation is fully reflected in CBEC consumers' decision-making process on social commerce platforms.

2.2.2. Opportunity factors

Opportunity factors in this study present the situational factors that either facilitate or inhibit CBEC consumers' behavior on social

commerce platforms (MacInnis and Jaworski, 1989). This study would like to identify three opportunity factors. First, time availability has been identified as the most common opportunity factor in existing MOA studies (Gruen et al., 2006; Li et al., 2019; Cui et al., 2020; Yang et al., 2020) and researchers also suggest that time availability represent the facilitator or inhibitor from the individual perspective. To better understand the cross-border products, consumers have to spend time searching, absorbing, and screening the information presented in social commerce posts. Thereby, only after investing a certain amount of time, CBEC consumers can have the opportunity to understand cross-border goods and thus support their purchase decisions.

Second, in the context of social media usage, several researchers believe the platform offers the opportunity to facilitate users' decisions. For example, Gruen et al. (2006) and Leung and Bai (2013) all believed the Internet connection and organization policy could facilitate an individual's opportunity to pursue desired behaviors, such as eWOM and social media involvement. Shih et al. (2013) identified the community tools and environment of the online forum as significant opportunity factors. Embracing the concept, this study employs platform empowerment as the opportunity factor offered by the social commerce platform. P platform empowerment refers to consumers' perceptions of facilitating the ability of the platform such as its resources and support available, which empower perform to consumers' needs whenever, wherever they desire (Vatanasombut et al., 2008). In this study, the social commerce platforms have many features to facilitate CBEC consumers' user experience, such as clearly presenting images, text, audio, and other content, providing comfortable user interaction interfaces, and ensuring a pleasant viewing experience. In other words, the platform offers a series of technical support, content support, and effective management and operation strategies to empower the CBEC consumers' decision-making.

Third, researchers also suggest incorporating the factors representing the opportunities generated by others. For example, Li et al. (2019) investigated social norms as an opportunity factor to facilitate employees' actions of energy-saving. Peer influence was examined as an opportunity factor to promote salespeople's intention of social media usage in the work of Guenzi and Nijssen (2020). In this study, we adopt eWOM generated from other viewers on the social commerce platform to investigate the opportunity factor. EWOM refers to the degree to which CBEC consumers believe that others' recommendation, experience, and information can facilitate their decision-making toward cross-border products (Kim and Park, 2013). Social commerce platforms not only offer posts written by bloggers but also present independent evaluation and eWOM from other viewers (Yang, 2021). Hence. CBEC consumers obtain the opportunities to understand the cross-border products from others' perspectives and adopt the wisdom of the crowd (Akram et al., 2021). To conclude, this study adopts time availability, platform empowerment, and eWOM to reflect the opportunity factors from the perspective of consumers themselves, the platform, and others respectively.

2.2.3. Ability

Self-efficacy is the most frequently adopted ability factor, which refers to an individual's ability to perform a behavior in existing literature (Cui et al., 2020; Shih et al., 2013). In this study, self-efficacy indicates individuals' judgments of their capabilities to make informed shopping decisions based on a comprehensive understanding of the cross-border products. For example, they should have the ability to use technologies and platform functions, such as the ability to search and browse posts and videos independently and effectively. And consumers should have the ability to identify useful information from a large number of social commerce posts in this era of information overload. Thereby, we believe self-efficacy is a significant ability factor in our research context.

2.3. Consumer involvement

Consumer involvement is the relationship between a consumer's perception of the object and the consumer's internal demands, values, and interests (Zaichkowsky, 1985), such as product involvement (Peng et al., 2019; Yu et al., 2019), brand involvement (Carlson et al., 2021), website involvement (Jiang et al., 2010), and community involvement (Shen et al., 2019). In traditional e-commerce studies, researchers have verified the positive effect of both product involvement and platform involvement on consumers' shopping decisions (Gutiérrez et al., 2010). In social commerce research, existing studies have also confirmed the critical role of consumer involvement in determining a variety of behaviors, such as consumer participation, loyalty (Carlson et al., 2021; Shen et al., 2019), and purchase intention (Peng et al., 2019; Bianchi et al., 2017; Huang, 2016).

For CBEC consumers, cross-border online shopping has more severe information asymmetry issues (Gutiérrez et al., 2010), thus consumers often devote more time and energy to the social commerce platform and to better evaluate the products. Hence, this study attempts to investigate product involvement and platform involvement. Product involvement suggests that consumers believe that the product is important to them, such as satisfying their needs, solving problems, or evoking their interests. It is unlikely that consumers are inclined to buy useless, irrelevant products, or the product evokes none of their interests. Consumers' cognitive evaluation and emotional affection towards the product can be enhanced while they spend more time and effort in understanding the product of interest. Thus, product involvement is the critical factor to unveil CBEC consumers' decision-making process in our research context.

Similarly, platform involvement suggests that consumers believe the platform is important to facilitate their shopping decisions. In other words, if the consumers believe the platform is useless, boring, and irrelevant to them, it is unlikely that the consumers will develop purchase intention due to the use of this platform. Especially, due to the existence of risk, uncertainty, and information asymmetry in the CBEC context, the high level of platform involvement can reduce their perceived shopping risks and increase their confidence in their shopping decisions (Zheng et al., 2020). Thereby platform involvement is the key antecedent to exploring consumers' purchase intention toward cross-border products. To conclude, with CBEC consumers' increasing engagement in reading the posts and sinteracting with others on the platform, they may better estimate the relevance between the product and themselves. Consequently, CBEC consumers would generate an emotional association and perceived significance with both the cross-border product (product involvement) and the social commerce platform (platform involvement) (Yu et al., 2019).

3. Research model and hypotheses development

This study develops a research model to explore how the consumers' CBEC information process and decision-making are impacted by three types of factors which are determined by motivation, opportunity, and ability. The research model is presented in Fig. 1.

3.1. The effect of motivational factors on involvement

According to MOA theory, motivations represent consumers' goal-directed appraisal, thus motivations indicate consumers' willingness to process information embedded in an environment (Macinnis et al., 1991). Driven by strong motivations, CBEC consumers' desire to understand the CBEC product moves from an initial state to the desired state, and thus they enter an activation level to involve in the information process deeply. In this process, CBEC consumers scrutinize and screen the relevant information, estimate the relevance and importance of the cross-border products, and eventually develop a high product involvement (Zaichkowsky, 1985; Andrews et al., 1990). In addition,

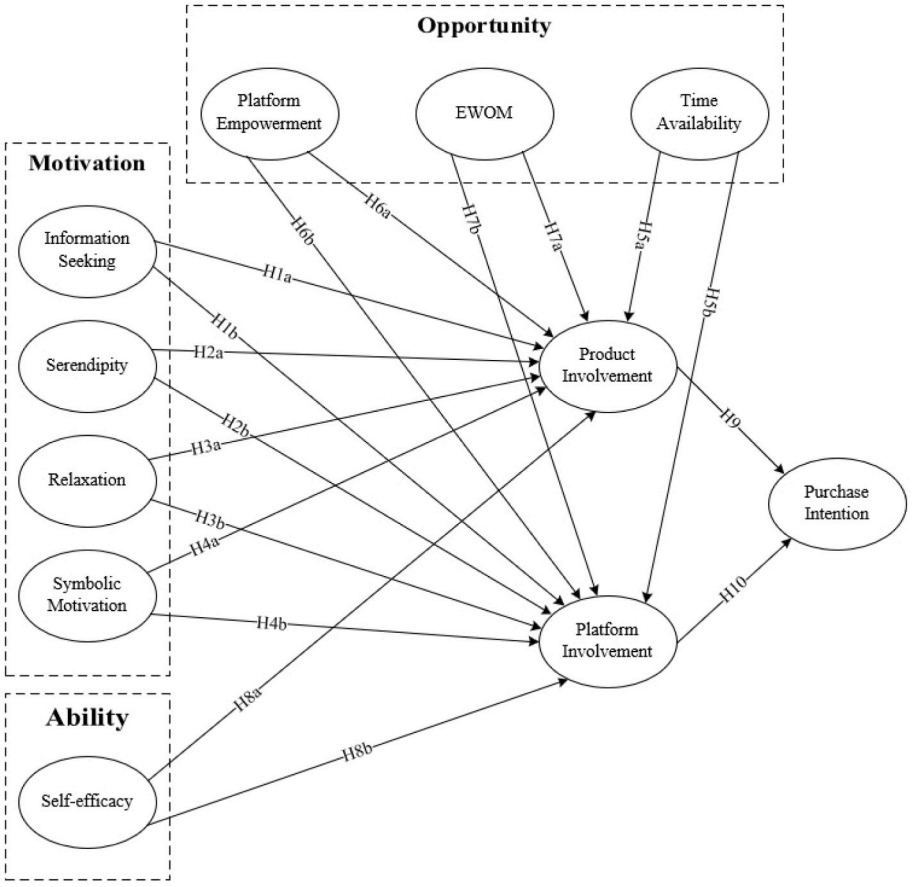


Fig. 1. Research model.

CBEC consumers believe that the social commerce platform is useful to facilitate their information process, thus generating platform involvement. Hence, we propose that motivations including information seeking, serendipity, relaxation, and symbolic motivation can significantly influence product involvement and platform involvement.

The information-seeking process enables consumers clear on their shopping goals, the reliability of the sellers and delivery service, and the convenience and enjoyment of the shopping (Chen et al., 2017). This process will facilitate consumers' understanding of cross-border products and also change their perceptions of the importance of the product (Lorenzo et al., 2012). In other words, product involvement is improved significantly due to consumers' information-seeking and processing (Lorenzo et al., 2012).

Meanwhile, the social commerce platform plays a critical role in satisfying CBEC consumers' information needs and solving their issue of information asymmetry issue in CBEC shopping, thus they are very likely to consider this platform appealing and beneficial (Zheng et al., 2020). In other words, individuals' perception towards platform involvement is enhanced significantly, since social commerce platforms have become an important channel for CBEC consumers to empower their decision-making processes. Hence, the following hypotheses are proposed:

H1a. Information seeking is positively associated with product involvement.

H1b. Information seeking is positively associated with platform involvement.

Discovering valuable and unexpected product-related information is part of the web browsing experience, and such an experience brings happiness and emotional satisfaction (Akram et al., 2018). During the discovering process, serendipity also affords open access to product-related informational content (Grange et al., 2019). The exciting and happy experience induces the consumers to indulge in digesting and estimating the information with emotional affection and surprise (Chung et al., 2017). In addition, serendipity suggests that the product information discovered by coincidence is highly related to consumers' interests and preferences (Chung et al., 2017). Consequently, CBEC consumers develop a close connection with the cross-border product and generate a high level of product involvement.

Meanwhile, the social commerce platform gathers rich information, offers an effective operational strategy, and applies an advanced recommendation algorithm to make CBEC consumers discover this serendipity information easily (Han and Kim, 2019). Hence, the platform enables the CBEC consumer to not only discover valuable information but also enjoy the browsing experience with happy surprises. These surprises and happy experiences are very likely to affect the development of a positive attitude toward the platform (Chen et al., 2017). As a result, consumers are more inclined to develop attachments and engagement with the platform. The following hypotheses are proposed:

H2a. Serendipity is positively associated with product involvement.

H2b. Serendipity is positively associated with platform involvement.

Social commerce platform endeavors to create a relaxed and pleasant atmosphere for their viewers (Yahia et al., 2018). Since the cross-border products information is presented to consumers vividly and interestingly, the information processing becomes a relaxing activity, and thus CBEC consumers are more willing to understand and evaluate the products. In other words, a pleasant atmosphere can attract consumers to indulge in viewing these posts and absorb the information happily, which will facilitate product information processing easily and smoothly (Huang, 2012). Consequently, consumers can develop an explicit

estimation of the product and its relevance to themselves.

Meanwhile, the pleasant experience of indulging in social commerce platforms can exert a positive impact on consumers' attitudes and perceptions toward the platform (Busalim et al., 2021). Similarly, researchers have supported the argument with empirical pieces of evidence to shed light on offering a good user experience with hedonic elements such as relaxation, pastime, and pleasure, since the gratification of these hedonic desires can lead to greater customer engagement and affective appraisal towards the platform in the shopping process (Chen et al., 2017). Hence, the following hypotheses are proposed:

H3a. Relaxation is positively associated with product involvement.

H3b. Relaxation is positively associated with platform involvement.

Social value is a critical predictor of purchase intention, and it can motivate potential consumers to engage in the shopping process (Gan and Wang, 2017). The impact of symbolic motivation on consumer involvement can be manifested in two ways. On the one hand, cross-border products are often assigned symbolic meanings in marketing promotion. Consumers learn the symbolic value carried by the cross-border products and estimate their relevance to themselves (Wongkitrungrueng and Assarut, 2020). When consumers believe that cross-border products represent their self-concept and have the symbolic value they desire, they are more likely to develop high product involvement (Bozkurt and Gligor, 2019).

On the other hand, in the process of browsing the posts and comments on social commerce platforms, consumers will "meet" bloggers or other viewers with the same preferences toward cross-border products. The sense of being accepted by people who share a similar point of view often helps individuals to develop social integration (Chen et al., 2019). Since such social integration is initiated on the social commerce platform, consumers will develop a sense of connection with the platform and enhance their involvement and attachment. Hence, the following hypotheses are proposed:

H4a. Symbolic motivation is positively associated with product involvement.

H4b. Symbolic motivation is positively associated with platform involvement.

3.2. The effect of opportunity factors on involvement

The involvement theory suggests that when people are in a certain situation, they would feel a degree of relationship association between the situation and themselves, and further develop an interest to explore this situation (Sherif and Cantril, 1947). While indulging in the environment created by social commerce platforms, it is a natural reaction that CBEC consumers would develop an interest and connection towards this specific situation and notice the significant situational elements. Prior studies have indicated that these situational factors, referred to as opportunity factors, can significantly promote an individual's involvement in the product and platform (Gutiérrez et al., 2010; Leung and Bai, 2013; Hong, 2015). Hence, this study proposes that the opportunity factors representing the platform, other viewers, and consumers themselves can lead to their involvement in product and social commerce platforms.

Time availability is usually considered an opportunity factor to promote or hinder individual behavior (Cui et al., 2020). For example, when consumers have little spare time, it might be difficult for them to engage in activities of information seeking and information exchange on social commerce platforms (Gruen et al., 2006; Huang, 2012). In contrast, sufficient time allows the consumers to carefully seek and analyze product information, obtain more factual information during interaction with others, and better estimate the importance and relevance of the cross-border product. Thereby, CBEC consumers are more likely to develop a higher product involvement.

Similarly, previous studies have shown that with the increase in time using social media platforms, users' involvement in the platform has also increased (Leung and Bai, 2013). Since sufficient time enables CBEC consumers ample opportunities to browse social commerce posts carefully, and thus consumers may develop a more comprehensive understanding of the platform (e.g., functions, services, policies, and mechanism of consumer protection). Thereby, CBEC consumers are more inclined to realize the importance of the platform and develop an attachment to the platform. In other words, time availability positively affects consumers' platform involvement. Hence, the following hypotheses are proposed:

H5a. Time availability is positively associated with product involvement.

H5b. Time availability is positively associated with platform involvement.

Social commerce platform offers consumers ample opportunities, such as accessibility to resources and support, and thus empowers them to better understand the product and platform for making better decisions (Vatanasombut et al., 2008). Platform operators are often meticulous in the design of platform interfaces to attract and sustain the consumers, such as exquisite pictures and appealing videos (Huang and Benyoucef, 2017). These efforts, convenience, resources, and accessibility are offered on the platform to improve consumers' experience of selecting, estimating, and understanding the products, which eventually enhances consumers' perception of the importance and relevance of the product (Zheng et al., 2020).

In addition, when customers are enabled to access the platform all the time and effectively accomplish their objectives on the website, such as finding the information they need and interacting with others conveniently (Olbrich and Holsing, 2011), consumers are likely to develop a positive estimation towards the usefulness and importance of the platform. In other words, consumers are more inclined to be attached to the platform, and the platform involvement is enhanced (Zheng et al., 2020; Busalim et al., 2021). Hence, the following hypotheses are proposed:

H6a. Platform empowerment is positively associated with product involvement.

H6b. Platform empowerment is positively associated with platform involvement.

The eWOM on the social commerce platform offers CBEC consumers numerous opportunities to seek opinions from a large number of other users. The opinions of others present a comprehensive understanding of the product from various perspectives, which can directly influence consumers' evaluation of the cross-border product (Huang and Benyoucef, 2015). Researchers believe that customer ratings and reviews are the independent evaluation of products, hence consumers often believe the eWOM has a higher chance to be more reliable, thus considering them as the trustworthy information source to facilitate their estimation of the importance and relevance of the cross-border product (Hajli, 2015).

Similarly, consumers can get to know the reputation of the social platform such as its services, functions, uniqueness, and policies from the eWOM. In other words, eWOM is considered the important social determinant of CBEC consumers' estimation of the platform (Chen et al., 2017). When potential consumers notice positive eWOM towards the platform, they will develop positive expectations toward the platform and thus generate platform involvement (Gefen et al., 2003). Hence, the following hypotheses are proposed:

H7a. EWOM is positively associated with product involvement.

H7b. EWOM is positively associated with platform involvement.

3.3. The effect of abilities on involvement

Prior studies suggest that consumers with high self-efficacy are more

likely to easily evaluate products using the information on online platforms and thus make informed decisions (Shih et al., 2013). Similarly, CBEC consumers with high self-efficacy often have technical skills to search and analyze information and social skills to exchange information with others. Thus, a high level of self-efficacy can help consumers to better understand the product and develop product involvement.

Meanwhile, consumers with higher self-efficacy can utilize and explore the social commerce platform well and develop a comprehensive understanding of the benefits and values they may obtain from the platform. As a result, these consumers are more likely to believe that the social commerce platform is beneficial and important for their CBEC purchase decision-making. Hence, the following hypotheses are proposed:

H8a. Self-efficacy is positively associated with product involvement.

H8b. Self-efficacy is positively associated with platform involvement.

3.4. The effect of involvement on purchase intention

The involvement theory suggests that consumers' product involvement can influence their attitudes and subsequent purchase decisions (Drossos et al., 2014). People with a low level of product involvement often suggest that consumers do not believe the product is necessary and important. In contrast, consumers in high-product involvement situations are more likely to evaluate the product as valuable and deserving of buying (Bian and Moutinho, 2011). Prior studies have also offered empirical pieces of evidence to support this conclusion (Peng et al., 2019; Yu et al., 2019), and indicated that both cognitive evaluation and emotional affection can be enhanced positively by product involvement to stimulate consumers' purchase decisions (Mou et al., 2020c). In our research context, the post often establishes a close connection between cross-border goods and individuals' own life situations, which can help consumers form a high degree of product involvement in a stronger purchase intention.

Similarly, when consumers have a high level of platform involvement, they are more inclined to have a higher degree of commitment, stronger interest, and trust in the platform (Zhu et al., 2019). Consequently, the high level of platform involvement can reduce their perceived shopping risks and increase their confidence in their shopping decisions (Mou et al., 2020c). Consumers are more inclined to devote time to browsing and understanding the cross-border products on the platform and make purchase decisions. Hence, the following hypotheses are proposed:

H9. Product involvement is positively associated with purchase intention.

H10. Platform involvement is positively associated with purchase intention.

4. Research design

4.1. Measurement development

The scales measuring the constructs in the research model were mainly adopted from the literature. Several items were modified based on our research context. The items for measuring information seeking (IS) were adopted from the study of Gan (2017) and Kim et al. (2011). The measures for serendipity (SER) were taken by Akram et al. (2018). We adopt the scales measuring relaxation (RE) from the work of Gan (2017), Kim et al. (2011), and Leung and Zhang (2016). This study utilizes the items from Wongkitrungrueng and Assarut (2020) to measure symbolic motivation (SM). The items for measuring time availability (TA) were adapted from the research of Li et al. (2019) and Cui et al. (2020). We developed the items from Vatanasombut et al. (2008) and Kim et al. (2011) to measure platform empowerment (PE). The scales measuring eWOM (EW) were modified from the work of Kim and Park (2013). By adopting the scales of Han et al. (2016) and Shih et al. (2013), we developed items to measure self-efficacy (SE). The measures of product involvement (PRI) and platform involvement (PLI) were modified from Mou et al. (2020c) and Zhu et al. (2019) respectively. Finally, the items for purchase intention (PI) were modified from Whang et al. (2021) and Dodoo and Youn (2021). All of the constructs employed in this research are reflective constructs. A 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used to measure all the items. All the measurements and related references for the constructs are shown in Appendix B.

To further ensure the facial validity of the measurements, a panel discussion was conducted. Seven experts, including five senior researchers in this field and two managers from CBEC firms, were invited to participate in the discussion. After the modification of several wordings, phrases, and sentences issue, all the panelists approved the readability, accuracy, and suitability of the questionnaire. We also conducted a small-scale pilot test by recruiting 107 undergraduate and graduate students with experience in using social commerce platforms to facilitate their CBEC shopping. The statistical analysis using the empirical data has confirmed the reliability and validity of the questionnaire. The final questionnaire includes three parts. The motivation letter explains the research motivation and ensures the confidentiality of the data collected. The second part mainly collects the demographic information of the respondents. The third part collects the responses to the constructs incorporated in the research model.

4.2. Sampling and data collection

We collected empirical data from a large-scale survey website in China (https://www.sojump.com). To ensure the quality of responses, the screening questions were employed: "Do you employ social commerce platform to facilitate your CBEC shopping decisions?". Only the respondents who replied "Yes" to this question were invited to proceed with the questionnaire. To further ensure the quality of the empirical, we also adopted the attention check questions (opposing questions and repeated questions). The survey data was collected from February 20, 2022, to March 3, 2022. In total, 401 respondents participated in our survey and 316 responses were verified as valid for the data analysis after the data screening based on the attention check questions.

The background information of the respondents is shown in Appendix C. The results show that 79.11% of the respondents are females, and 20.89% are males. The gender distribution is in accordance with prior studies (Gao et al., 2021; Liu et al., 2021). In addition, the results also indicate that 66.77% of the respondents are 18–25 years old, and 75.36% of the respondents are undergraduates. The age distribution of our sample complies with that in existing literature (Chen et al., 2019; Liu et al., 2021), and the educational degree distribution is also in line with prior studies (Zhao et al., 2020). In addition, most respondents browse CBEC posts several times a week, which is consistent with prior studies (Gao et al., 2021; Xu et al., 2020). At last, we find that the most popular CBEC product categories are makeup and clothing & shoes, which is also in line with prior studies (Shao et al., 2021).

5. Data analysis and research results

This study applied smart PLS 3.0 as the statistical technique to execute PLS-SEM analysis. We chose PLS-SEM for two reasons. First, PLS-SEM is particularly useful to evaluate the complex model. Considering our conceptual model contains 11 constructs and 18 hypothesized relationships, which is suitable to apply PLS-SEM. Second, PLS-SEM is particularly useful for theory development and examining unexamined relationships previously, which can contribute to the theoretical extensions and the uninvestigated hypotheses of the MOA framework in this study (Hair et al., 2019). PLS-SEM has been widely applied by prior studies published in notable journals and found to be an effective method for data analysis (Riemenschneider et al., 2021; Jia et al., 2022;

Jena, 2022). Following the two-phase approach of confirmatory factor analysis, this study analyzed the measurement model and structural model.

5.1. Measurement model

In order to analyze the measurement model, convergent validity and discriminant validity were performed. We employed Cronbach's alpha, factor loading, and average variance explained (AVE) values to examine the convergent validity (Chin, 1998). As the analytical results shown in Appendix D, all of the values of Cronbach alpha are greater than 0.7, the factor loading of each item is not less than the threshold of 0.7, and the AVE values all exceed the thresholds of 0.5. Consequently, the results imply that the convergent validity is satisfactory. Regarding the discriminant validity, on the one hand, it has been assessed as satisfied since the square root of each AVE is greater than inter-construct correlations as indicated in Appendix E (Chin, 1998). On the other hand, this study applied the Heterotrait-Monotra Ratio of Correlations (HTMT) approach to examine the discriminant validity (Henseler et al., 2015). As shown in Appendix F, the obtained values are all below the acceptable cut-off of 0.85. Both two approaches ensure the discriminant validity of all constructs in our measurement model. Moreover, we also estimate the model fit of the measurement model. The value of the standardized root means square residual (SRMR) of our model is 0.05, which is below the threshold of 0.08 and indicates a satisfactory model fit. Finally, we examined the variance inflation factor (VIF) scores. As shown in Appendix D, the highest VIF value is 3.318, which is well below the threshold value of 10 and indicates that there are no instances of multicollinearity among any of the variables (Hair et al., 2010).

5.2. Common method bias

Considering this study collected empirical data by self-report from the same sources, common method biases (CMB) may exist (Jakobsen and Jensen, 2015). Hence, following the notion of prior studies (Lo et al., 2022; Tewari et al., 2022), we applied both statistical and procedural assurance to avoid the severity of CMB.

Regarding the procedural measures (Podsakoff and Organ, 1986), we have applied three ways to avoid the issues of CMB. First, the respondents were informed that there is no wrong or correct answer and they only need to answer the questions truthfully based on their own perceptions and thoughts (Leong et al., 2018). Second, we applied different scale formats of the variables (Podsakoff et al., 2003). All of the critical variables were measured with the 5-point Likert scale while the demographic information such as gender was measured as the nominal scale and age, usage frequency, and educational background were measured as ordinal scales (Leong et al., 2020). Moreover, as we declared in the process of data collection, the respondents were assured of anonymity and confidentiality of their answers and we also asked respondents to ensure the correctness of their responses. Further, simple sentences and precise language were ensured to improve the clarity of our questionnaire (Liang et al., 2007).

In addition, three statistical analyses were employed to assess the threat of CMB. First, this study employed Harman's single-factor test to conduct the principal components factor analysis of all variables in our study. This approach suggests the existence of CMB when a factor accounts for the majority of the covariance (Pavlou et al., 2007). Results show that most covariance explained by a single factor is 29.674%, which is below the acceptable threshold of 50% and implies that the CMB is not likely a potential problem for our results (Podsakoff and Organ, 1986). Second, as indicated by Bagozzi et al. (1991), CMB is likely to be an issue if the correlations among the constructs are found to be above 0.9. As presented in Appendix G, all the correlations between variables are below the threshold of 0.9. Thus, given the above assurance and analysis, CMB is not an issue in this study.

5.3. Structural model

Through employing bootstrapping techniques, the explanatory power and path importance of structural models were examined. Fig. 2 depicts that the explained variances for product involvement, platform involvement, and purchase intention are 40%, 60%, and 35% respectively. Moreover, we also applied Q^2 to evaluate the cross-validated redundancy of the structural model. The Q^2 of product involvement, platform involvement, and purchase intention are 0.19, 0.27, and 0.34 respectively, which are all above 0 and indicate the predictive relevance of factors (Fornell and Cha, 1994).

Regarding the impact of the four customer motivations on product involvement and platform involvement, the test results support hypotheses H1a ($\beta = 0.234$, $p < 0.001$), H2a ($\beta = 0.200$, $p < 0.05$), H2b ($\beta = 0.137$, $p < 0.05$), H3b ($\beta = 0.103$, $p < 0.05$), and H4b ($\beta = 0.120$, $p < 0.1$). This reveals that product involvement is only positively associated with information seeking and serendipity (utilitarian motivation), while platform involvement is positively associated with serendipity (utilitarian motivation), relaxation (hedonic motivation), and symbolic motivation (social motivation) in terms of social commerce CBEC. Regarding the effects of opportunities on product involvement and platform involvement, the relationship between time availability and product involvement (H5a) is not supported, while the relationship between time availability and platform involvement (H5b) ($\beta = 0.160$, $p < 0.001$) is supported. The test results support hypotheses H6a ($\beta = 0.163$, $p < 0.05$), H6b ($\beta = 0.141$, $p < 0.05$), H7a ($\beta = 0.158$, $p < 0.05$), and H7b ($\beta = 0.216$, $p < 0.001$), representing a positive influence of platform empowerment and eWOM on product involvement and platform involvement. Regarding the associations between self-efficacy and two-type consumer involvement, we found that only platform involvement is positively associated with self-efficacy, so hypothesis H8b ($\beta = 0.202$, $p < 0.001$) is supported. At last, we further examined the association between two types of consumer involvement and purchase intention. The results unveil that both product involvement and platform involvement strongly affect purchase intentions; thus, hypotheses H9 ($\beta = 0.299$, $p < 0.001$) and H10 ($\beta = 0.381$, $p < 0.001$) are supported. The results of the path analysis of the research model are presented in Fig. 2.

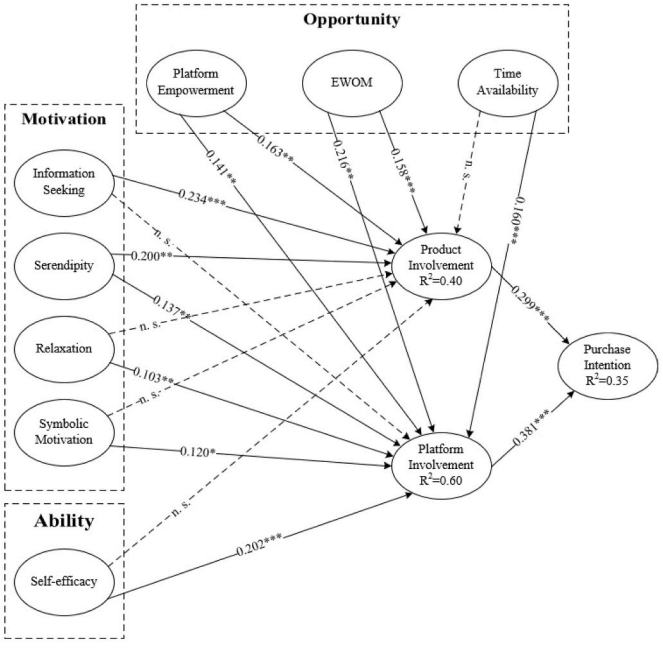


Fig. 2. Results of path analysis
Note: *: $p < 0.1$, **: $p < 0.05$, ***: $p < 0.01$, n. s.: not significant.

5.4. Artificial neural network (ANN) analysis

5.4.1. Artificial neural network (ANN)

The accuracy of SEM analysis has been challenged in recent years since it assumes the relationship between constructs is linear relationships and compensatory (Lo et al., 2022). This assumption oversimplifies the complicated and multifactorial decision-making processes (Chong, 2013). Considering our research context is an emerging and complex field that lacks in-depth and fully explored, a more robust and reinforced analytical approach is further required to complement and validate the SEM results.

To overcome the limitations of SEM results, this study further applied the artificial neural network (ANN) analysis, which has been widely used as a machine-learning tool to mimic the human brain. ANN analysis is considered to have a much higher-order prediction capability to identify the latent and complex relationships since it can identify the non-linear and non-compensatory relationships without affecting by collinear independent variables (Chong, 2013; Wilson and Bettis-Outland, 2020; Alharbi and Sohaib, 2021). However, the exploration of ANN is based on a "black box" operation, which is not apt for examining the proposed hypothesis (Leong et al., 2020). Hence, to overcome the shortcomings and take advantage of both SEM and ANN, the integration of SEM and ANN analysis can improve the capability of exploring complex decision-making procedures by achieving the twin objectives of hypothesis testing and prediction.

Considering the complexities of consumers' decision-making process towards cross-border products and the complicated usage environment composed of diversified factors of social commerce. We applied a dual-stage SEM-ANN approach not only can validate the hypnotized consumers' decision-making process promoted by social commerce, but also can unveil the importance rank and identify the most critical drivers in influencing consumers' decision-making in such an environment influenced by multiple factors with higher prediction accuracy.

Thus, after initially testing the proposed hypotheses with SEM, we obtained the significant determinants and applied them as the input neurons in the ANN model. We explored the importance rank of determining factors in influencing CBEC consumers on platform involvement and product involvement in ANN model 1 and model 2 respectively. In addition, we investigated the ranking of all antecedent variables affecting purchase intentions in ANN model 3 to further understand consumer the role of social commerce in promoting sales. Three ANN models presented in Fig. 3.

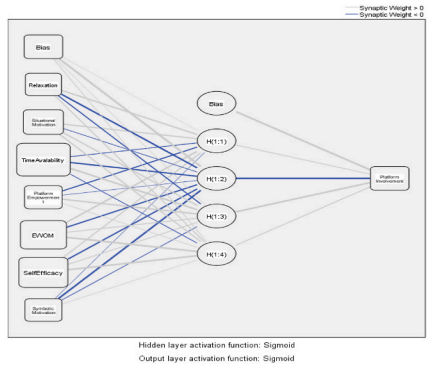
5.4.2. Validation of neural network

This research applied *SPSS v.26* to conduct the ANN analysis. The widely used feed-forward backpropagation multilayer training algorithm with the sigmoid activation function to train the ANN model (Leong et al., 2020). In addition, the hidden and output layers were computer automatically by the algorithm. To overcome the concern of overfitting, a ten-fold cross-validation analysis with 90% data for training and 10% data for testing was adapted (Wang et al., 2022).

Following the notion of prior studies, this study applied the Root Mean Square of Error value (RMSE) to validate the predictive accuracy (Liébana-Cabanillas et al., 2017; Sharma et al., 2021). As shown in Table 1, the lower average RMSE values for both training and testing processes ranged from 0.082 to 0.147, which implies a higher degree of predictive accuracy and represents a satisfactory fit and reliable forecast of the data (Lo et al., 2022).

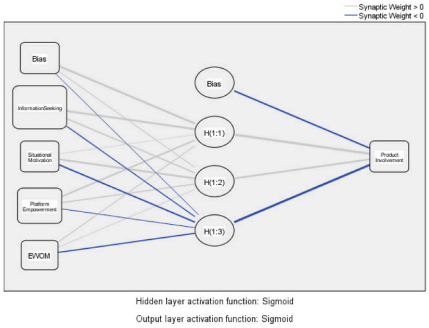
5.4.3. Sensitivity analysis

To measure the predictive power of each input neuron, a sensitivity analysis was performed to rank the input constructs in terms of their normalized relative importance to the output constructs, which implies how dependent variables change with independent variables (Sharma



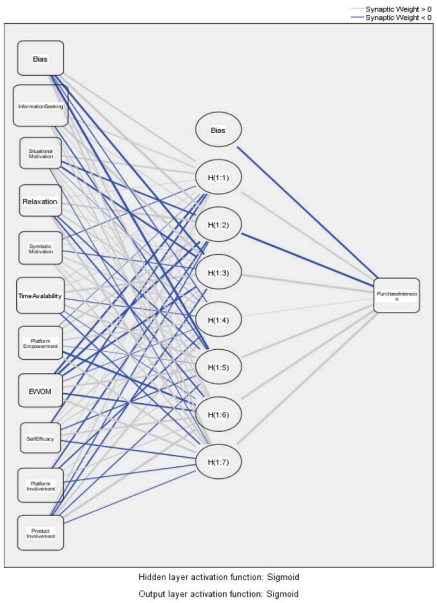
ANN model 1

Output neuron: Platform Involvement



ANN model 2

Output neuron: Product Involvement



ANN model 3

Output neuron: Purchase Intention

Fig. 3. ANN model.

Table 1
Neural network validation results.

	ANN model 1 Output neuron: Platform Involvement		ANN model 2 Output neuron: Product Involvement		ANN model 3 Output neuron: Purchase Intention	
	Training	Testing	Training	Testing	Training	Training
ANN1	0.080	0.077	0.139	0.148	0.149	0.216
ANN2	0.077	0.077	0.154	0.127	0.106	0.102
ANN3	0.078	0.081	0.148	0.118	0.107	0.091
ANN4	0.074	0.081	0.141	0.142	0.101	0.084
ANN5	0.080	0.087	0.151	0.111	0.104	0.100
ANN6	0.081	0.071	0.143	0.163	0.101	0.107
ANN7	0.076	0.086	0.150	0.132	0.102	0.112
ANN8	0.082	0.063	0.157	0.098	0.101	0.107
ANN9	0.076	0.070	0.146	0.143	0.101	0.083
ANN10	0.083	0.123	0.143	0.166	0.102	0.079
Mean	0.079	0.082	0.147	0.135	0.107	0.108
S. D	0.003	0.016	0.006	0.021	0.014	0.037

et al., 2021). Table 2 shows the results of the sensitivity analysis which ranks the relative importance of antecedents toward product involvement, platform involvement, and purchase intention.

As presented in Table 2, In terms of ANN Model 1, time availability (100.00%) is of great importance to platform involvement, whereas self-efficacy (83.29%) and eWOM (82.43%) are also the important relative predictor in promoting consumers' platform involvement. As for ANN Model 2, information seeking is the most prominent predictor of product involvement (100.00%) and followed by serendipity (66.19%). EWOM and platform empowerment represent relatively lower importance in influencing consumers' product involvement with 58.74% and 47.74% respectively. Moreover, as displayed in ANN model 3, Information seeking (100%) is also the most important predictor of purchase intention far more important than others, followed by the similar effects of platform involvement (68.99%) and time availability (68.48%).

Finally, we compared the ranking of the significant determinants between the results of PLS-SEM and ANN models based on path coefficient and normalized relative importance (Lo et al., 2022). As compared in Table 3, the results of ANN model 1 and model 2 do not fully match SEM results, implying the relationship between variables may not fully be explained from a linear perspective and confirming the complexity of CBEC consumers' decision-making processes under the practical context of social commerce (Wang et al., 2022).

6. Discussion

Employing the MOA framework, this study aims to examine how the motivational factors including information seeking, serendipity, relaxation, and symbolic motivation, opportunity factors including time availability, platform empowerment, and eWOM, and self-efficacy as the ability factor may exert impacts on product involvement and platform involvement, and the following purchase intention. The research model is supported by empirical data and explains 40% of the variance of product involvement, 60% of the variance of platform involvement, and 35% of the variance of purchase intention. In addition, the research results unveil several exciting findings.

First, this study examined the relationships between 8 antecedents and product involvement, while 4 of these eight hypotheses were supported. The results suggest that utilitarian motivational factors, including information seeking and serendipity, and two of the three opportunity factors, platform empowerment and eWOM, all have statistically significant effects on product involvement. The results are supported by prior studies, such as the work of Gutiérrez et al. (2010) and Han and Kim (2019). Incorporating the ANN analysis, we identified the top three most significant antecedents: information seeking, serendipity, and eWOM. The results are not only in line with prior studies that shed light on the effect of CBEC product information in improving consumers' informativeness towards the product and the decision (Guo et al., 2021; Xu et al., 2021; Han and Kim, 2019), but also consistent with the observation of the phenomenon. In other words, purchase decision-making naturally relies on the understanding and analysis of the product information (Mou et al., 2020c), thus it is a logical and natural conclusion that the factors related to cross-border product information play an indispensable role in determining the CBEC consumers' product evaluation process.

As refer to the unsupported hypotheses, including H3a, H4a, H5a, and H8a, this study endeavors to offer explanations. Relaxation does not exert a significant effect on product involvement (H3a). It might be because that CBEC consumers mainly seek the satisfaction of their hedonic needs from the experience of viewing the post or exploring the interesting content on social commerce platforms rather than the cognitive process of evaluating the product rationally. Prior studies also suggest that the hedonic gratifications consumers obtain mainly from their usage of social commerce platforms (Akram et al., 2021). Interestingly, our results also verify that relaxation significantly affects

Table 2
Sensitivity analysis.

	ANN1	ANN2	ANN3	ANN4	ANN5	ANN6	ANN7	ANN8	ANN9	ANN10	Mean importance	Normalized importance
Model 1 Output neuron: Platform Involvement												
RE	0.066	0.093	0.045	0.113	0.041	0.108	0.078	0.092	0.107	0.109	8.53%	39.51%
SER	0.095	0.122	0.143	0.116	0.104	0.103	0.103	0.060	0.121	0.077	10.44%	48.32%
TA	0.227	0.223	0.235	0.205	0.239	0.189	0.216	0.208	0.206	0.212	21.60%	100.00%
PE	0.142	0.105	0.131	0.118	0.118	0.085	0.051	0.116	0.068	0.093	10.27%	47.56%
EW	0.187	0.168	0.166	0.149	0.188	0.179	0.217	0.194	0.171	0.161	17.81%	82.43%
SE	0.151	0.190	0.194	0.185	0.196	0.169	0.207	0.161	0.197	0.150	17.99%	83.29%
SM	0.132	0.099	0.087	0.113	0.115	0.166	0.128	0.168	0.129	0.198	13.35%	61.80%
Model 2 Output neuron: Product Involvement												
IS	0.426	0.394	0.387	0.331	0.389	0.290	0.437	0.363	0.280	0.370	36.67%	100.00%
SER	0.196	0.294	0.189	0.196	0.243	0.240	0.183	0.286	0.340	0.262	24.28%	66.19%
EW	0.170	0.166	0.260	0.281	0.189	0.261	0.183	0.267	0.177	0.201	21.54%	58.74%
PE	0.208	0.147	0.165	0.193	0.179	0.209	0.196	0.084	0.203	0.167	17.51%	47.74%
Model 3 Output neuron: Purchase Intention												
IS	0.099	0.122	0.218	0.212	0.196	0.273	0.243	0.190	0.221	0.234	20.09%	100.00%
RE	0.054	0.097	0.019	0.053	0.015	0.018	0.030	0.044	0.075	0.037	4.42%	21.99%
SER	0.100	0.028	0.039	0.067	0.083	0.049	0.096	0.063	0.038	0.063	6.25%	31.13%
SM	0.147	0.175	0.027	0.054	0.119	0.070	0.121	0.040	0.057	0.063	8.74%	43.49%
TA	0.138	0.015	0.204	0.156	0.070	0.144	0.198	0.149	0.165	0.138	13.76%	68.48%
SE	0.051	0.021	0.095	0.041	0.088	0.039	0.015	0.046	0.047	0.028	4.72%	23.50%
EW	0.070	0.069	0.108	0.067	0.100	0.061	0.078	0.087	0.092	0.075	8.06%	40.13%
PE	0.110	0.071	0.138	0.109	0.020	0.062	0.025	0.053	0.058	0.071	7.18%	35.75%
PLI	0.181	0.227	0.100	0.146	0.170	0.133	0.016	0.164	0.117	0.131	13.86%	68.99%
PRI	0.051	0.175	0.052	0.094	0.139	0.151	0.178	0.165	0.130	0.159	12.93%	64.37%

Table 3
PLS-SEN and ANN results comparison.

PLS path	Path coefficient	ANN results: normalized relative importance (%)	PLS-SEM ranking based on path coefficient	ANN ranking based on normalized relative importance (%)	Remark
Model 1. Output neuron: Platform involvement					
IS → PRI	n.s.	/	/	/	/
RE → PLI	0.103**	39.51%	**7**	**7**	Match
SM → PLI	0.120*	61.80%	6	4	Match
SER → PLI	0.137**	48.32%	5	5	Match
PE → PLI	0.141**	47.56%	4	6	Not match
EW → PLI	0.216***	82.43%	1	3	Not match
TA → PLI	0.160***	100.00%	3	1	Not match
SE → PLI	0.202***	83.29%	2	2	Not match
Model 2. Output neuron: Product involvement					
IS → PRI	0.234***	100.00%	1	1	Match
RE → PRI	n.s.	/	/	/	/
SM → PRI	n.s.	/	/	/	/
SER → PRI	0.200***	66.19%	2	2	Match
PE → PRI	0.163**	47.74%	3	4	Not match
EW → PRI	0.158**	58.74%	4	3	Not match
TA → PRI	n.s.	/	/	/	/
SE → PRI	n.s.	/	/	/	/
Model 3 Output neuron: Purchase intention					
IS → PI	/	100.00%	/	1	/
RE → PI	/	21.99%	/	10	/
SM → PI	/	43.49%	/	5	/
SER → PI	/	31.13%	/	8	/
PE → PI	/	35.75%	/	7	/
EW → PI	/	40.13%	/	6	/
TA → PI	/	68.48%	/	3	/
SE → PI	/	23.50%	/	9	/
PLI → PI	0.381***	68.99%	1	2	Not match
PRI→ PI	0.299***	64.37%	2	4	Not match

platform involvement, while its effect on product involvement is not supported statistically.

The association between symbolic motivation and product involvement is not supported (H4a). The result is in accordance with the study of Wongkitrungrueng and Assarut (2020). We believe the result is associated with the fundamental concept of symbolic motivation and the feature of the social commerce platform. Social integration, social connection, and social identity represent the symbolic value pursued by CBEC consumers, which are realized in the social community rather than a product; thus, its effect on the evaluation of a commodity, such as the cross-border products is weak. In addition, the usage of CBEC and the behavior of buying cross-border products have become a common phenomenon, thus CBEC does not bring a strong sense of superiority in the social and economic status. At last, the significant role of time availability on product involvement is not supported (H5a). On the one hand, once CBEC consumers have obtained the necessary cross-border product information, their evaluation of the product may not change dramatically with the increase in time. On the other hand, consumers might have developed their evaluation of cross-border product information during their daily life and shopping habit. Thus, the increasing time of browsing posts on social commerce platforms may not necessarily lead to a higher degree of product involvement. Prior MOA studies have also suggested that time availability does not exert a significant effect on individual behaviors in energy-saving behaviors (Li et al., 2019).

Second, as refers to platform involvement, seven of the eight hypotheses are supported by empirical evidence. In other words, excluded information-seeking, other antecedents including serendipity, relaxation, symbolic motivation, time availability, platform empowerment, eWOM, and self-efficacy all exert statistically significant effects on platform involvement. These results are consistent with prior literature (Leung and Bai, 2013; Shih et al., 2013). It might be due to that CBEC consumer often seek information to support their purchase decision toward a specific cross-border product. In other words, consumers may focus on how the information obtained may facilitate their understanding of a specific product (product involvement) rather than on the evaluation of a platform (Han and Kim, 2019). In addition, this result is in line with the findings in the work of Bianchi and Andrews (2018) and implies that the effect of the informativeness of social media on users' platform involvement is marginal.

To better explore the role of motivational, opportunity, and ability factors in determining platform involvement, this study applied ANN analysis to reveal the importance rank of these factors. The ANN results both confirm and compensate for the SEM results. The ANN analysis indicates that time availability, eWOM (opportunity factors), and self-efficacy (ability factor) are the top three most significant factors in influencing platform involvement. Time availability suggests that CBEC consumers have sufficient time to browse the posts. The work of Leung and Bai (2013) supports our findings and suggests that individuals' involvement in social media (hotel webpage) is significantly improved when people have more spare time. EWOM plays the second important role in predicting platform involvement; the significance of eWOM is supported by prior literature (Kim and Park, 2013). Busalim et al. (2021) have indicated that consumers tend to adopt the opinion of others to make their decisions. When CBEC consumers' needs are satisfied by the social commerce platform, they are very likely to develop platform involvement. While the critical role played by self-efficacy is supported by existing literature (Shih et al., 2013). The significance of the ability factor is also in line with our observation of the phenomenon. The research context we investigated is a highly technology-enabled situation, and the decision-making process requires a strong ability to analyze information effectively and rationally. Thus, the ability factor has been ranked as the top three most influential factors. In addition, the incorporation of ANN and SEM results unveils that symbolic motivation and serendipity are the most important motivational factors in determining platform involvement. The results are in accordance with the findings in the research conducted by Wongkitrungrueng and Assarut (2020). Consequently, the important roles of social motivation and utilitarian motivation are confirmed in our research context.

Third, both product involvement ($\beta = 0.299$) and platform involvement ($\beta = 0.381$) exert significant effects on purchase intention. The results are in line with the findings in prior studies (Mou et al., 2020c; Zhu et al., 2019). At the same time, platform involvement is a more potent factor in influencing purchase intention compared to the effect of product involvement. The results imply that though understanding the

cross-border product is important, consumers' commitment and trust in the platform can promote their purchase intention to a greater extent. With the increased level of platform involvement, consumers are more inclined to spend more time on the platform and thus obtain comprehensive information for making an informed decision.

In addition, the ANN analysis is conducted to unveil the importance rank of all the antecedences, including the motivational, opportunity, and ability factors, as well as the involvement factor. The ANN analysis endeavors to compensate for the SEM analysis and offer a comprehensive understanding of the phenomenon of interest (Wang et al., 2022). The results show that information seeking, platform involvement, and time availability are the top three important factors. The results suggest that comprehensive information searching, and the perceived importance and trustworthiness of the platform are critical for consumers to make shopping decisions; meanwhile, they need sufficient time to carefully consider the purchase decisions.

7. Implication and future study

7.1. Theoretical implication

This study endeavors to contribute several theoretical implications to the literature. First, to the best of our best knowledge, this study is one of the pioneers in applying the MOA framework in the context of social commerce-facilitated CBEC. The contextualization of MOA comprehensively interprets CBEC consumers' decision-making process empowered by social commerce. Prior CBEC studies have merely explored this important phenomenon. A handful of studies only attempt to focus on the effect of a single aspect, such as technological or motivational factors (Guo et al., 2021; Han and Kim, 2019; Xu et al., 2021), rather than offer a comprehensive understanding of the determining factors on consumers' shopping decisions in this context. Hence, this study not only contributes to the CBEC literature by investigating consumers' information processing and decision-making process based on a different theoretical perspective but also provides useful knowledge to MOA literature in an emerging area.

Second, this study is one of the early attempts to identify the concrete motivational factors and opportunity factors to represent the features of this specific context. Xu et al. (2021b) indicated that the research focus on specific contexts can reveal detailed and accurate understandings of the phenomenon. As refer to motivational factors, most studies investigate general motivations such as utilitarian and hedonic motivation (Cui et al., 2020; Yee et al., 2021). While this study carefully identified four concrete motivational factors to reflect the unique features in our research context, including information seeking, serendipity, relaxation, and symbolic motivation. Similarly, most studies mainly explore time availability as the opportunity factor (Cui et al., 2020; Gruen et al., 2006; Leung and Bai, 2013; Li et al., 2019; Yang et al., 2020). While this study comprehensively captured the opportunity factors from three aspects, including time availability, platform empowerment, and eWOM, to represent the opportunities facilitated by the consumer himself or herself, the platform, and the other users. Hence, by identifying the most representative motivational and opportunity factors and mapping them under the MOA theoretical tenet, this study not only enriches the MOA framework but also demonstrates the contextualization of MOA and expands its explanatory power in this specific context.

Third, this study explores the relationships between MOA factors, consumer involvement, and sequential purchase intention. The research results enrich the knowledge related to consumers' decision-making mechanism under the tenet of the MOA framework. Prior MOA studies mainly investigated the direct associations between MOA elements and behavioral factors (Guenzi and Nijssen, 2020; Kettinger et al., 2015). However, little research has explored the complexity of the decision-making process by addressing the uniqueness of the research contexts. This study carefully explored how the different factors representing consumers' motivation, opportunity, ability, and the combinations of these factors will exert distinct influences on product involvement and platform involvement, and further lead to consumers' CBEC shopping decisions. Exploring the underlying mechanism with empirical evidence, this study interpreted the process from "heartbeat" to "action" in the CBEC context by extending and contextualizing the assumptions proposed in MOA.

Last but not least, employing a hybrid SEM-ANN analysis, this study adopts a new perspective to explore the complexity of consumers' decision-making process and identify the driving forces of social commerce in influencing consumers' involvement and purchase intention toward cross-border products. This study applies SEM-based hypotheses testing to validate the assumed hypotheses and identify the statistically significant drivers of the dependent variables and integrates ANN analysis to rank the significance of critical drivers with a higher predictive power. Applying a mixed-method analytical approach that complements and validates each other not only can enhance the robustness and precision of the results but also can contribute to a more scientifical and reasonable research design in investigating an emerging and complex phenomenon for future study.

7.2. Practical implication

The research results provide several implications for platform managers and practitioners. On the one hand, our research findings identify several factors that are important to both product involvement and platform involvement. Platform managers should especially allocate resources to improve these factors since the effort can contribute to the two involvements. These factors are eWOM and serendipity. As referred to eWOM, the rewarding mechanism should also be carefully designed to encourage individuals to share their eWOM. The platform managers should also identify and promote the hot topics (e.g., tariff and return policy) and the most popular cross-border products to attract individuals to leave their comments. In addition, the platform manager may increase CBEC consumers' opportunities to discover serendipity information, such as adopting advanced technology, AI, and algorithm to recommend posts to individuals based on their preferences and needs.

The empirical results also identified the factors that exert significant effects either on product involvement or platform involvement. Platform managers who endeavor to allocate limited resources to only one type of involvement may design effective managerial and marketing strategies accordingly. *First*, the research results indicated that information-seeking is the most significant factor affecting product involvement. Due to the significance of information in determining shopping decisions, social commerce platform managers should especially focus on improving both the quality and quantity of the information offered on their platforms.

Second, the results suggest that time availability and self-efficacy are the two most significant factors affecting consumers' platform involvement. Hence, platform managers should focus on designing effective mechanisms to attract consumers to spend more time on the platform. Such as the reward system to encourage the users who spend a certain amount of time on the platform and improve the attractiveness, novelty, and usefulness of the content to draw CBEC consumers' attention. In addition, instructions and an online help center should be provided to CBEC consumers and facilitate their usage and answer their questions simultaneously. Moreover, both the results of SEM and ANN unveil that, symbolic motivation plays an important role in the effect of consumers' platform involvement. And platform managers may offer diverse topics and sub-communities to make CBEC consumers easily find the social group sharing similar interests and preferences with them and thus develop the social integration and identify on the social commerce platform easily.

7.3. Limitations and future study

This study endeavored to offer useful knowledge to both literature

and practitioners in the field of CBEC facilitated by social commerce, while we are also aware of the limitations. First, this study may have some limitations from the method and sampling perspective, thus offering the opportunity for future research. On the one hand, a cross-sectional survey is employed to obtain self-report responses at a point in time. Thus, this study cannot examine the actual behavior in a longitudinal period. The limitation offers the opportunity to conduct future research by employing other methods, such as longitudinal surveys or experimental studies, to explore the actual behavior of CBEC consumers over time. In addition, we recruited the survey sample from mainland China since the CBEC development in China is experiencing rapid development. Future research should examine the phenomenon in other countries or regions with different cultures, economic situations, and social environments. On the other hand, this study adopted mixed analytical methods to offer solid and comprehensive results. While due to the research focus and space limit, this study did not include more research methods to further examine the phenomenon. Hence, future studies may adopt other research approaches, such as qualitative research, expert interviews, and comparative experiments, to offer different methodological approaches and add more knowledge to the phenomenon.

Second, although this study has endeavored to capture comprehensive factors to represent the motivational, opportunity, and ability factors in this specific research context, the research model did not produce a complete list of all the possible antecedents. Future studies should explore other influential factors from several perspectives. In addition, future research may extend the exploration of the relationships between the factors, such as the mediating and moderating factors. For example, researchers have called the examinations towards the moderating role of opportunity and ability factors in determining individuals' decisions (Hughes, 2010). In addition, since the research context capture both the social feature and commerce feature, future research may explore the features related to individuals' background information (e.g., shopping habits, impulsive buying tendency, gender, and income) the personality (e.g., extravert and introvert, or altruism).

Author contributions

Xu X.Y. and Jia Q.D. conceived of this study and participated in the design, administration of the study. Jia Q.D. performed the data analysis. Xu X.Y., Gao Y.X. and Jia Q.D. drafted and revised the manuscript at several stages of the writing process. Xu X.Y. and Jia Q.D. revised the manuscript at several stages of the reviewing process. All authors read and approved the final manuscript.

Declaration of competing interest

The authors declare no conflict of interest.

Data availability

Data will be made available on request.

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Appendix A. The classification of MOA factors

Context (Authors)	Motivational factors			Opportunity factors			Ability factors
	Utilitarian	Hedonic	Social	Individual	Platform	Others	
knowledge sharing (Yee et al., 2021)	Perceived reputation	Enjoyment					Self-efficacy
Online auctions (Cui et al., 2020)	Possession; Economic; Efficiency	Hedonic		Time availability			Bidding experience
Social marketing (Guenzi and Nijssen, 2020)	Perceived usefulness				Perceived organizational support	Perceived peer influence	Ability to use social media
Tourism branding (Yang et al., 2020)	Increase of knowledge	Enjoyment; Fun		Time pressure			Prior knowledge
Energy-saving (Li et al., 2019)	Awareness of consequence			Time availability	Organizational support; Accessibility to control	Social norms	Knowledge; Perceived behavior control
Tourism development (Rasoolimanesh et al., 2017)	Perceived benefits	Residents' interest in participation			Political will, rules		Knowledge
knowledge sharing (Kettinger et al., 2015)	Perceptions of rewards				Perceived information technology support		Perceived information management capability
Social marketing (Leung and Bai, 2013)	Learn about things; Get information	Enjoyable; fun; Entertaining	Social interaction; Social integration	Time availability	Internet connection; Organization policy		Self-efficacy
E-commerce (Shih et al., 2013)	Usefulness and benefits of reviews	Interesting		Time availability	Communication tools		Self-efficacy
Tourism (Hung et al., 2011)	Perceived tourism benefits				Political opportunities; communication channel		Knowledge
E-commerce (Gruen et al., 2006)		Interesting	Social interaction	Time availability	Internet connection; Organization policy		Self-efficacy

Appendix B. Measurements

Constructs	Measurement items		Reference
Information Seeking (IS)	In the social media platform,		Gan (2017); Kim et al. (2011)
	IS1	I can obtain useful information about cross-border products.	
	IS2	I can obtain helpful information about cross-border products.	
	IS3	I can research information about cross-border products.	
Serendipity (SER)	In the social media platform,		Akram et al. (2018)
	SER1	I can obtain unexpected insights.	
	SER2	I unexpectedly discovered by chance what I want to buy before.	
	SER3	I unexpectedly discovered information by chance what I need before.	
	SER4	I can find things that surprised me.	
Relaxation (RE)	Through social media platforms to learn about cross-border products:		Gan (2017); Kim et al. (2011); Leung and Zhang (2016)
	RE1	I feel relaxed.	
	RE2	I feel it is entertaining for me.	
	RE3	I feel it is pleasure.	
	RE4	I feel it is funny.	
	RE5	I feel it is pressure (reverse).	
Symbolic Motivation (SM)	Through browsing posts on social media platforms:		Wongkitrungrueng and Assarut (2020)
	FC1	I can infer social acceptance of products.	
	FC2	I feel I can identify with other users.	
	FC3	I feel that other users have the same taste as me.	
Time Availability (TA)	In my daily life:		Li et al. (2019); Cui et al. (2020)
	TA1	I have some time to pay attention to cross-border products introduced on social media platforms.	
	TA2	I have extra time to think about cross-border products introduced on social media platforms.	
	TA3	I have free time to browse social media platforms.	
Platform Empowerment (PE)	The services offered by social media platforms:		Vatanasombut et al. (2008); Kim et al. (2011)
	PE1	allow me to have control over my browsing.	
	PE2	allow me to browse posts anytime, anywhere.	
	PE3	allow me to browse what I want for less effort.	
eWOM (EW)	I have heard from other users that the cross-border product is:		Kim and Park (2013)
	EW1	very useful.	
	EW2	very reliable.	
	EW3	worth to purchase.	
Self-efficacy (SE)	I think using social media platforms to learn about cross-border products:		Han et al. (2016); Shih et al. (2013)
	SE1	is easy for me.	
	SE2	is not difficult for me.	
	SE3	is a way that I am generally good at.	
	SE4	is a way that I am very skilled.	
	SE5	can be achieved by myself.	
Platform Involvement (PLI)	I think the social media platform		Zhu et al. (2019)
	PL1	is important.	
	PL2	is of great concern.	
	PL3	means a lot.	
	PL4	is significant.	
	PL5	matters a lot.	
Product Involvement (PRI)	The cross-border product recommended on the social media platform:		Mou et al. (2020c)
	PR1	is important to me.	
	PR2	is interesting to me.	
	PR3	is needed for me.	
	PR4	is fascinating to me.	
	PR5	is involving to me.	
Purchase Intention (PI)	After browsing posts of cross-border products on social media platforms:		Whang et al. (2021); Dodoo and Youn (2021)
	PI1	I am going to buy this product.	
	PI2	I will consider purchasing this product.	
	PI3	I may purchase this product.	
	PI4	I probably buy this product.	

Appendix C. Demographic information of subjects

Variable (N = 316)	Classification	Frequency	%	Variable (N = 316)	Classification	Frequency	%
Gender	Male	66	20.89	Frequency on browsing posts	Everyday	32	10.13
	Female	250	79.11		Several times a week	150	47.47
Age					Once a week	39	12.34
	18–25	211	66.77		Less than once a week	95	30.06
	26–30	19	6.01	Major product categories			
	31–40	18	5.70	Purchased *(multiple-choice question)*	Makeup	226	71.52
	Above 40	68	21.52		Clothing & shoes	187	59.18
					Health & Medical	65	20.57

(*continued on next page*)

(*continued*)

Variable (N = 316)	Classification	Frequency	%	Variable (N = 316)	Classification	Frequency	%
Education	High school and below	26	8.23		Luggage & accessories	70	22.15
	Undergraduate	239	75.63		Baby Products	7	2.22
	Postgraduate and above	51	16.14		Digital appliances	111	35.13
					Home & personal care	81	25.63
					Global food	137	43.35
					Others	17	5.38

Appendix D. Statistical results of some indicators

Construct	Item	Factor loading	Cronbach's α	rho_A	CR	AVE	VIF
Information Seeking (IS)	IS1	0.88	0.75	0.78	0.87	0.67	2.21
	IS2	0.88					2.22
	IS3	0.70					1.26
Serendipity (SER)	SER1	0.76	0.76	0.80	0.86	0.60	1.25
	SER2	0.76					1.82
	SER3	0.73					1.78
	SER4	0.81					1.78
Relaxation (RE)	RE1	0.84	0.87	0.88	0.90	0.65	1.81
	RE2	0.79					1.78
	RE3	0.88					1.59
	RE4	0.76					1.58
	RE5	0.76					2.26
Symbolic Motivation (SM)	SM1	0.85	0.73	0.74	0.85	0.65	2.24
	SM2	0.86					2.68
	SM3	0.71					2.09
Time Availability (TA)	TA1	0.81	0.71	0.71	0.84	0.63	1.74
	TA2	0.75					3.21
	TA3	0.82					3.31
Platform Empowerment (PE)	PE1	0.75	0.71	0.74	0.85	0.64	2.73
	PE2	0.82					3.19
	PE3	0.82					2.49
eWOM (EW)	EW1	0.89	0.83	0.84	0.90	0.75	1.41
	EW2	0.88					1.73
	EW3	0.83					1.47
Self-efficacy (SE)	SE1	0.88	0.92	0.92	0.94	0.76	1.77
	SE2	0.89					1.86
	SE3	0.87					1.76
	SE4	0.88					1.21
	SE5	0.83					1.47
Platform Involvement (PLI)	PLI1	0.79	0.82	0.83	0.88	0.61	1.30
	PLI2	0.79					1.40
	PLI3	0.77					2.11
	PLI4	0.74					2.04
	PLI5	0.74					1.72
Product Involvement (PRI)	PRI1	0.88	0.86	0.88	0.91	0.65	2.94
	PRI2	0.72					1.42
	PRI3	0.88					2.95
	PRI4	0.86					2.41
Purchase Intention (PI)	PI1	0.79	0.77	0.77	0.85	0.62	1.46
	PI2	0.75					1.43
	PI3	0.76					1.71
	PI4	0.75					1.63

Appendix E. Statistical results of discriminant validity

Construct	IS	RE	SER	TA	PE	EW	SE	PLI	PRI	PI	SM
IS	**0.82**										
RE	0.15	**0.81**									
SER	0.18	0.16	**0.76**								
TA	0.06	0.16	0.04	**0.79**							
PE	0.24	0.11	0.21	0.08	**0.80**						
EW	0.10	0.12	0.15	0.08	0.11	**0.87**					
SE	0.21	0.17	0.18	0.11	0.14	0.14	**0.87**				
PLI	0.24	0.25	0.29	0.22	0.26	0.30	0.33	**0.76**			
PRI	0.25	0.13	0.24	0.02	0.20	0.17	0.15	0.25	**0.80**		
PI	0.24	0.13	0.19	0.15	0.18	0.19	0.21	0.28	0.24	**0.77**	
SM	0.24	0.15	0.31	0.19	0.22	0.19	0.20	0.34	0.17	0.25	**0.81**

Note: the diagonal values in bold represent the square root of AVE.

Appendix F. Heterotrait-monotrait ratio of correlations (HTMT)

Construct	IS	RE	SER	TA	PE	EW	SE	PLI	PRI	PI	SM
IS											
RE	0.45										
SER	0.54	0.45									
TA	0.33	0.52	0.21								
PE	0.67	0.41	0.59	0.36							
EW	0.38	0.39	0.45	0.36	0.41						
SE	0.54	0.46	0.49	0.40	0.45	0.42					
PLI	0.61	0.58	0.65	0.60	0.67	0.65	0.65				
PRI	0.62	0.38	0.58	0.14	0.54	0.44	0.41	0.56			
PI	0.64	0.43	0.53	0.50	0.57	0.53	0.55	0.65	0.58		
SM	0.66	0.48	0.73	0.61	0.65	0.56	0.55	0.76	0.48	0.69	

Appendix G. Inter-Construct Correlations

Construct	IS	RE	SER	TA	PE	EW	SE	PLI	PRI	PI	SM
IS	1.00										
RE	0.39	1.00									
SER	0.42	0.40	1.00								
TA	0.49	0.39	0.55	1.00							
PE	0.24	0.40	0.20	0.43	1.00						
EW	0.49	0.33	0.45	0.47	0.29	1.00					
SE	0.32	0.34	0.39	0.43	0.29	0.33	1.00				
PLI	0.46	0.41	0.43	0.45	0.33	0.37	0.38	1.00			
PRI	0.49	0.50	0.54	0.58	0.47	0.51	0.54	0.57	1.0000		
PI	0.50	0.36	0.49	0.41	0.13	0.45	0.40	0.38	0.50	1.00	
SM	0.49	0.36	0.44	0.50	0.39	0.42	0.44	0.46	0.53	0.49	1.00

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